

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### An Improved Filtering Agent for Tobacco Smoke

We, MARIO FRANCOME, LEON BRAIE, REBECA BERLINSKY DE SCHRAGA and MARIA ELENA PATINO DE GIBELLINI, all Citizens of Argentina, all of 177, Bolivar Street, Buenos Aires, Argentina, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to what are commonly called smokers' articles, and more especially it refers to a novel composition of materials calculated to act efficiently in eliminating one of the most noxious constituents of tobacco smoke.

The toxicity of smoke inhaled by smokers being well known, they are more or less anxious about said toxicity being likely to give rise to general troubles sooner or later, which, according to medical science, originate from the frequently repeated introduction of the toxicant into the smoker's organism.

It is a fact already well established that there is no lineal relationship between the amount of toxin, when introduced into the body, and the effect produced thereby, inasmuch as the relation between cause and effect is strongly influenced by the person's receptivity or ability of eliminating toxicants.

A smoker smokes, because he indulges in tobacco, and does so as often as he has a mind to, and even if he acknowledges and owns that he is not unaware that tobacco disagrees with him. Those who are less unconscious of its effect feel perturbed by a constant preoccupation, and notwithstanding, persist in the habit owing to the fact that tobacco, they say, is indispensable to them.

Anyhow, it must be admitted that no advice, either of experts or of lay people, will persuade a smoker that he ought to diminish his daily amount of tobacco or break off the habit entirely. Whether harmful or not, tobacco has asserted

itself, and all the world over, many million people are tobacco consumers, 50 and do not want to drop the habit.

Considering the impossibility of stopping tobacco consumption, mankind has tried to solve the problem on the line of least resistance by admitting the impossibility in question and endeavouring, as far as possible, to attenuate the dangerous consequences to which a smoker is exposed.

This orientation is pursued by creating different means which tend to lessen the toxicity of the smoke of tobacco. In practice, those means have led to the creation of the well known filters for tobacco smoke.

All the filters known hitherto are the result of more or less earnest and thorough investigations, and those investigations are based upon the knowledge of the chemical composition of 70 tobacco smoke.

Constant efforts are directed to improvement of the results achieved hitherto with those means, the proof being that there is a great variety of 75 filters on the market; and although novel filters make their appearance periodically, the last word has not yet been said in this matter.

The present invention shows a novelty 80 in the field and is focused on a point of view not considered heretofore with respect to the end attained.

Rational research work done by a large number of investigators in connection 85 with tobacco smoke has demonstrated that it contains more than forty constituents, the enumeration of which is unnecessary; but it is advisable to make it clear that among all those constituents 90 the most dangerous ones are tars, nicotine and carbon monoxide, because of their intrinsic aggressiveness, or owing to the quantity existent therein.

There is a general belief that among 95 the above three main constituents it is

nicotine which is more dangerous, hence most or all of the known filtering agents are designed for the purpose of retaining this product, and in accordance with the literature usually attached to said agents. Even the aggressiveness of tars has not been left out of consideration, and there are many agents adapted to retain this constituent.

10 There is no doubt that the majority of agents are designed with a view to eliminate nicotine and tar, and it is true that some of them, on account of their characteristics, are adapted to answer the purpose more or less perfectly. However, it is an unquestionable fact that as yet there is no agent whatever adapted for retaining carbon monoxide efficaciously.

Carbon monoxide is a constituent of 20 tobacco smoke as noxious as the other two. Its dangerousness is not only a function of its inherent toxicity, but also of the high percentage in a given volume of smoke. As a matter of fact it has been 25 found that a gramme of tobacco, when smoked, under specific conditions, produces up to a hundred or more cubic centimetres of carbon monoxide.

Such a high figure is alarming and 30 justifies any attempt relating to the elimination of this constituent, preventing it from penetrating to the smoker's lungs.

The principal object of the present 35 invention is to attain the neutralization of this noxious constituent, achieving the desired result through oxidation produced by specific agents, whereby carbon monoxide is transformed into innocuous 40 carbonic acid gas. The recourse in question is attained through a realization forming a new industrial product. Said realization materializes a filtering agent of standard design for smokers, said 45 agent being characterized in that, in addition to its other components, it comprises specific metal oxides acting as oxidizing agents, and with the fundamental property of said metal oxides 50 being inherent in a material acting as a support and able to prevent the pernicious action of moisture on said oxides.

Therefore, this invention refers to a filtering agent for tobacco smoke which 55 is characterized by the presence of specific metal oxides embodied in a highly hygroscopic material.

An accessory object of the invention is 60 a filtering agent consisting of such materials that it is adapted to protect a smoker from the injurious action of carbon monoxide.

Still another accessory object of the invention is a filtering agent adapted to 65 provoke an oxidation of the carbon

monoxide contained in the tobacco smoke and transform it into innocuous carbonic acid gas.

The primordial component aforementioned being able to act alone on carbon 70 monoxide, and in view of the obvious fact that a good filtering agent must also eliminate the dangerousness of the other noxious agents contained in tobacco smoke, it may well be imagined that constitutive unity of manufacture of the filtering agent according to the invention, must comprise other substances for complementing the action of the main substance, in order to achieve an agent 75 80 adapted to retain tars and nicotine and to bring about simultaneously oxidation of carbon monoxide existing therein.

A further object of the present invention is, then, a filtering agent for 85 tobacco smoke, which agent consists of a number of materials, one of which is able to provoke oxidation of the carbon monoxide contained in tobacco smoke, the others having the property of retaining 90 the other harmful constituents of said smoke such as tar, nicotine, etc.

The invention is based on the fact that certain metal oxides have the capacity to effect oxidation of carbon monoxide. This 95 capacity of specific materials, in itself, is already known and has been employed in gas masks in use during war and for industrial purposes.

Metal oxides, mentioned hereinbefore, 10 broadly speaking, are, in reality, represented preferably by manganese dioxide and cupric oxide adequately mixed and with an admixture of other specific metal oxides, existing in smaller quantities. 10

A highly advisable composition is as follows:—

Manganese dioxide	—	—	—	—	—	60%
Cupric oxide	—	—	—	—	—	38%
Ferric oxide	—	—	—	—	—	2%
Silver oxide	—	—	—	—	—	traces
Cobalt oxide	—	—	—	—	—	traces

This mixture acts with absolute efficiency oxidizing carbon monoxide and transforming it into the corresponding 1 dioxide. However, reaction is possible only in the absence of water, inasmuch as it has been found that moisture prevents such reaction.

It is, then, essential to condition the 1 product so that it can act efficiently on tobacco smoke since, as is well known, said smoke contains a high percentage of moisture.

The invention refers to the discovery 1 of the high efficiency of this oxide mixture, when embodied in a given quantity of slaked lime.

The best proportioning of metal oxides and slaked lime is in the ratio of one to 1

three, without this being an absolute figure, for good results are also achieved with a proportion different from the aforementioned.

5 With respect to the mixture of oxides, the formula of which has been given as above, it is to be understood that manganese dioxide and cupric oxide are indispensable, and a composition containing only both these substances may be considered efficient, although it is true that this mixture cannot be said to be best. The addition of ferric oxide in small amounts remarkably improves the efficiency of the product, and an admixture of silver oxide and/or cobalt oxide in very small amounts leads, no doubt, to the best result for the end pursued.

10 The embodiment of the metal oxide mixture in slaked lime can be accomplished in any desired way; yet the best results are achieved, when said incorporation is carried out during the preparation of the slaked lime. In any way, 20 it is advisable from all points of view, and it may be considered essential, that the metal oxides and slaked lime should be mixed as intimately as possible; greater perfection of mixture always 25 yields better results in the oxidising process of carbon monoxide.

30 The product formed by the mixture, the characteristics of which have been established, acts as follows: when it 35 enters into contact with a given amount of tobacco smoke, the moisture thereof is rapidly absorbed by the slaked lime, and then the carbon monoxide inherent in said smoke is oxidized in the presence of 40 the metal oxides existing in the composition. Tobacco smoke thus treated contains, then, carbonic acid gas, which is 45 innocuous to smokers.

50 The industrial filter unit, a product of the present invention, need not be described in detail, because, as may well be imagined, it will, in general, be formed by a little tubular holder, open at its ends, which in the interior thereof accommodates a certain amount of the filtering 55 agent made up of the slaked lime and metal oxide mixture. The filter unit must be complemented with other absorbent and/or adsorbent substances, such as cotton, active charcoal, silica gel, etc., which have the property of absorbing and/or adsorbing tars and nicotine. Aside from this, these substances are able by themselves, to retain a great part of 60 vapour dragged along with smoke so that it reaches the oxidising mixture, free already from a great part of the water pernicious for said mixture. It should also be stated that the filter unit 65 must be adjusted in such a manner that

its location in e.g. the cigarette holder ensures the previous passage of smoke through the complementary materials, wherefrom it is inferred that the slaked lime-metal oxide mixture has to occupy 70 the filter part next the suction end of the cigarette holder.

75 A filter unit, prepared in the aforesaid form, is by far more efficient than any one of the known standard designs, for it acts and retains all noxious products of tobacco smoke, especially the three most important and universally acknowledged as most injurious to the health of man; tars, nicotine and carbon monoxide. 80

85 The efficiency of the filter unit keeps till its saturation, which is a function of the portion of the active mixture filling each unit: it can safely be said, however, that it is quite impossible to obtain, in filters of standard size, a charge acting 90 efficiently as a purifier for as many as twenty cigarettes.

95 The invention is capable of variation within the scope of technical advisability. So the proportions of the above formula may be varied within certain bounds, and the formula may be complemented with other oxides having the property to act efficaciously for the attainment of this purpose. Those variations are logically included within the sphere of protection of the present invention as established by the following claims.

100 What we claim is:—

1. A filtering agent for tobacco smoke characterised in that it comprises, as active material, slaked lime mixed with manganese dioxide and cupric oxide.

105 2. A filtering agent according to claim 1, characterised in that the active material consists of a quantity of slaked lime mixed with a smaller quantity of manganese dioxide and cupric oxide.

110 3. A filtering agent according to claim 1, characterised in that in the mixture of oxides, manganese dioxide is present in an amount preponderant in relation to cupric oxide.

115 4. A filtering agent according to any one of the foregoing claims, characterised in that the active material also contains ferric oxide.

120 5. A filtering agent according to any one of claims 1 to 3, characterised in that the active material also contains silver oxide.

125 6. A filtering agent according to any one of claims 1 to 3, characterised in that the active material also contains cobalt oxide.

130 7. A filtering agent for tobacco smoke characterised in that it comprises, as active material, slaked lime mixed with

manganese dioxide, cupric oxide, ferric oxide, silver oxide, and cobalt oxide.

8. A filtering agent for tobacco smoke characterised in that it comprises, as active material, a product consisting of approximately, three parts of slaked lime and one part of metal oxide mixture containing manganese dioxide and cupric oxide.

10 9. A filter unit for tobacco smoke, characterised in that it comprises a holder containing absorbent and adsorbent materials, and complemented with an active filtering agent provoking oxidation of carbon monoxide, this agent consisting of a material containing slaked lime together with a quantity of metal oxides, among which are manganese dioxide and cupric oxide.

20 10. A filtering unit for tobacco smoke characterised in that it comprises a

tubular sheath, open at its ends, containing absorbent and adsorbent materials the unit being complemented with an active filtering agent adapted to oxidize 25 carbon monoxide and transform it into dioxide, this agent consisting of slaked lime combined with a metal oxide mixture made up of manganese dioxide and cupric oxide, in a greater proportion, 30 ferric oxide in a smaller proportion and traces of silver oxide and cobalt oxide.

11. Filtering units for tobacco smoke substantially as hereinbefore described.

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